Aquaculture in Maine:
A Policy for a Sustainable Industry

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1. Executive Summary

Aquaculture has employed over 1000 people (Inches MS 2001, Anon. 2001)[1] and produces Maine's second largest seafood harvest. Its value in 2000 was in excess of $100 million.[2] It offers Maine substantial potential for growth and employment opportunities. Aquaculture in general has greater potential for significant growth than any other seafood industry (Tacon 2003). It has generated significant controversy for a variety of reasons. Both industry proponents and those concerned about it for various reasons identify the climate of uncertainty as their principal concern. Aquaculture in Maine is a symptom of increasing conflicts of coastal uses, real and potential. The challenge is to accommodate and balance the various interests and concerns for coastal development – of which aquaculture is the most conspicuous and urgent point of contention.

This paper is not intended to present a comprehensive analysis of the status, potential, and problems of Maine's aquaculture industry. Its purpose is to attempt to identify the principal issues affecting the future of aquaculture in Maine and to suggest the need for an explicit state policy to foster the long-term sustainable development of aquaculture.

2. Background

A form of shellfish aquaculture was authorized by the Maine Legislature early in the last century, but little happened. In the 1970s there were unsuccessful attempts at trout farming in the midcoast area. Shellfish farming began in the 1970s and early 1980s and has continued and expanded ever since. By 2002 there were 445 acres leased by the State for eighty shellfish farm sites. Seaweed farming also began about twenty years ago and now leases about seven acres. Salmon farming began in Cobscook Bay in the early 1980s. By 2002 750 acres were leased for forty-four finfish sites (Fisk MS 2002). This finfish acreage is approximately equal to one-third of Rockland harbor. Finfish production reached over 35 million pounds in 2001 (Inches MS 2001). The production dropped in 2002 and 2003 because of losses caused by disease and winter temperatures. Maine is the largest marine aquaculture producer in the United States. The combined economic impact of finfish and shellfish[3] farming in Maine may be close to $200 million (see note 2). The salmon industry is largely

[1] Indirect employment apparently is subject to debate. James Wilson, Professor of Marine Science, UMO, stated total employment of the salmon industry in Maine, direct and indirect, to be 2500 (see Impact of the Atlantic Salmon Industry on the Maine Economy at www.umaine.edu/marinescience/archives/ResEconomics/salmon-economy.htm). A study initiated by the Department of Marine Resources and now underway will estimate direct and indirect employment which will differ from earlier estimates.

[2] Survey by Maine Aquaculture Association. With respect to the salmon industry, James Wilson estimated "pre-tax, personal income" at $110-140 million (see note 1/). Linda Kling and Michael Opitz, Associate Professors, UMO, estimated the "farmgate" salmon value in 2000 at $65 million and the total economic impact at $195 million (see The Farming of Atlantic Salmon in Maine at www.umaine.edu/mainesci/Archives/marine sciences/salmon-farming.htm). The value dropped in 2002 and 2003 because of losses from diseases and winter-kill. Two new independent economic evaluations are in progress at this writing.

[3] Oyster cultivation is estimated at approximately $2 million. The Portland Press Herald, July 15, 2003, reported the

but not exclusively that of three large foreign-owned companies with aquaculture interests elsewhere in the world. The shellfish industry is mainly characterized by one Maine-owned medium-sized company and a number of small Maine-resident entrepreneurs.

3. Aquaculture's Strengths

A. Growing World Demand

The world's population and its demand for protein will continue to increase. Seafood is the protein of choice for many by taste preference and for good health. The capture fisheries of the world are not increasing and it is likely that they will decrease for the foreseeable future. The only arena of potential increase of fish protein is shellfish and finfish aquaculture. The practicality of expanded aquacultural seafood production is not in doubt. Its production potential has been variously estimated, but there is no question that it is substantial. The Food and Agricultural Organization (FAO) of the United Nations projects aquaculture production to double in thirty years, reaching about 80 million tons (Tacon 2003) or roughly equal to the world's wild fish landings. Aquacultural growth worldwide is projected by FAO to increase more than any other animal protein product.

There is some debate about the potential for growth of salmon aquaculture in Maine, depending largely upon the availability of suitable sites, but there is certainly potential for significant growth in shellfish culture and perhaps for other finfish species, and for seaweed culture.

B. Investment Potential

The industry in Maine enjoys strong investment potential if investors are persuaded that the industry can be accommodated on the coast. The coast of Maine has been proven to be a generally favorable environment for finfish and shellfish production, and it offers a capable, dependable labor force. The Maine coast is located closer to major and expanding markets than any other region producing farm-raised salmon. Aquaculture can produce significant, sustainable, and predictable quantities of seafood without the destabilizing uncertainties of traditional fisheries management and its ever-changing regulations.

C. Viability

Aquaculture is now more than twenty years old in Maine and considerably older elsewhere. Even in Maine where the practice is relatively youthful it is beyond the experimental stage and well into the viable production stage. But the rather recent rapid growth of aquaculture in some areas of Maine has raised a variety of concerns about its impacts. The concerns appear in some part to be the result of novelty and uncertainty. The Damariscotta River has witnessed shellfish aquaculture for more than twenty years. The development and practice of aquaculture in the river is now relatively noncontroversial, according to the director of the Damariscotta River Association, and apparently is accepted as one of the normal activities on the "working" river. No adverse environmental

harvest of mussel cultivation to be worth approximately $7.5 million.

consequences have been reported. Aquaculture in the Damariscotta River seems to have grown beyond the controversies that occurred in its early years. There seems to be a maturation process at work there. Whether that process will be the pattern elsewhere in Maine, where the industry remains controversial, remains to be seen.

D. Responsiveness

Some members of Maine's finfish aquaculture industry perceive it to be "the most heavily monitored industry in the United States."[4] Whether true or not, the salmon industry, through its trade association, has responded to real and potential environmental and "housekeeping" issues by developing codes of containment and of practices, and undoubtedly continues to learn from and correct past mistakes. The industry is very aware that it must maintain good housekeeping practices.

4. Aquaculture's Weaknesses

A. Controversy

Aquaculture is controversial in many regions of the world; this general concern is used to support and reinforce concerns about aquaculture lease applications and practices in Maine. It is noteworthy that no Maine group states its opposition to the concept of aquaculture in Maine, but only to specific projects and the terms of their operations. At nearly all aquaculture lease hearings a wide range of concerns are voiced. The principal target is the finfish industry, but shellfish lease applications are similarly controversial. Some of the expressed concerns are not justified,[5] but the industry has not been effective in presenting the facts of its operations.

The concerns in Maine may be based in part on emotional or aesthetic opposition to aquaculture or to its visual impact on what is often characterized as "the wild and scenic" character or resources of the coast of Maine. This is a legitimate concern (although the coast itself can hardly be considered "wild"), and because of its subjective nature this issue would be a challenge to administer by regulatory agencies. The issue of visual impact could be of particular concern for the future of the industry if applied as a reason to deny a lease application because there are very few parts of the coast that would not be described as scenic.
There are of course concerns about aquaculture that have substance and are part of the controversy. These will be considered below.
The level of controversy in some areas now is such that it is perceived by some to threaten the very future of the industry in Maine. Indeed, there is a strong belief within the industry that that may be the intent of some concerned people – and the perception has caused increasingly hostile and bitter

[4] The Maine Aquaculture Association notes that Maine's marine farmers must comply with up to sixteen federal regulatory acts and must obtain between five and fourteen federal and state permits, depending upon the type of farm operations, before they can begin operations.

[5] One concerned and active organization lists fifty objections to high-density fish farms. The organization's secretary has noted that many of these objections are controversial, undocumented, or incorrect. See Rockefeller 2003.

attitudes among some coastal residents.[6] For this reason it is important to try to understand the nature of the controversy.

Traditional capture fishing is widely accepted as a time-honored livelihood in Maine and an integral and essential part of the coast, but fishermen are increasingly threatened with a decreasing resource base. Whereas in earlier years Maine fishermen had access to perhaps a dozen species of value, there is now only one significant fishery in our coastal waters – the lobster fishery – and that last remaining resource is under ever increasing pressure. The disappointing landings in 2003 through August reinforce fears of the fragile status of the lobster resource. There is growing fear of its decline. Some families with generations of fishing traditions therefore look to aquaculture as a means of continuing to earn their livelihood from the sea and as a way to relieve excessive pressure on the lobster resource. This was in fact a motivation for the fishermen of one coastal community to support a finfish farm in their vicinity. Recent lease hearings considered aquaculture applications by traditional fishermen. Such people view with hostility efforts to minimize or even eliminate aquacultural employment options on the coast. The industry has the potential for supporting a traditional coastal life style of income from the sea and for providing employment opportunities where few others exist.

This is particularly true in eastern Maine, a region of limited employment opportunities. It is ironic that twenty or more years ago, when presented with the possibility of employment opportunities in heavy industries to be located in the Eastport area, there were broadly-based calls for alternative "clean" industries compatible with the Maine coastal environment and traditions. Aquaculture is the only industry of any significance that has appeared or is likely to appear in the foreseeable future in eastern Maine, and it is now in some areas at least as controversial as were the heavy industry proposals of earlier years.

B. Defensiveness

Part of the controversy now is the concern that aquaculture is a "dirty" industry, posing unacceptable risks and hazards to the environment, wildlife, the traditional fishing industry, public health, and aesthetics and view-sheds of the Maine coast. It is true that there have been real and well publicized problems within the finfish industry related to diseases, winter-kill mortalities, escapements, and other concerns. There has been publicity about other issues[7] that are marginally or negligibly related to the Maine industry. All are cited as reasons for concern. Maine's aquaculturists seem to be on the defensive under the burden of these charges, to the point that those employed by the industry – and those who hope to be – fear that investment capital may be withdrawn from Maine and the industry shut down. And aquaculturists report that they are losing valuable employees in part because of the uncertain future created by the controversy. Pessimism prevails within the industry.

Those concerned about negative impacts of aquaculture invoke many reasons for their positions, but

[6] One commentator on the draft of this paper "found the framing of the issue in adversarial terms to be unfortunate." He is quite correct; it is unfortunate. Regrettably, there is little doubt that the controversy is at times adversarial.

[7] Such as dyes, antibiotics, and market conditions.

maintain that they are not opposed to aquaculture as such, only to the way in which it is practiced. Some concerned groups propose conditions that may be impractical,[8] or uneconomical, or might jeopardize the future of the industry.

For example, there are repeated calls for aquaculture leasing decisions and the practice of aquaculture within the context of Bay Management, a concept implemented elsewhere in the world but for rather specific and narrowly defined purposes – purposes that are much more limited than have been proposed in Maine. Proponents of Bay Management have cited as an example the concept as practiced in Ireland – C.L.A.M.S.[9] But C.L.A.M.S. is for the explicit purpose of enhancing aquaculture by coordinating industry responses to common environmental or biological problems.[10] It is not a licensing or regulatory entity. Proponents of the concept in Maine believe that it could be expanded to equitably involve all "stakeholders" (not yet identified) and result in comprehensive planning and management of social, cultural, economic, environmental, and aesthetic resources, and to determine whether or not, and how, aquaculture would occur in local areas. Legislation (LD 1088) proposed in 2003 to study the concept was not enacted.

The recently appointed Aquaculture Task Force is charged with considering the Bay Management concept. It is not clear with respect to aquaculture leases that the concept could legally substitute for or would be a significant improvement over the current adjudicatory process.[11] It would undoubtedly be a much "messier" process than the present system – whatever one thinks of the present system. It has been charged that the concept as proposed in Maine would – and is intended to – delegate the decision authority to local interests that do not want aquaculture in their regions. A somewhat different concept has been proposed based upon "nested platforms" which are defined as a council of representatives of different stakeholder groups facilitated by a neutral third party and operating within "institutions at higher decision-making."[12] Whether this concept would be practical and beneficial remains to be seen.

It has been suggested that there should be a zoning plan stating where aquaculture could and would not take place. The idea may at first thought be attractive; it might appeal as providing a sense of

[8] The first draft of this paper used the word "utopian" here which my dictionary defines as, i.e., “any idealistic goal or concept for social and political reform.” I thought it appropriate, but a number of commentators objected, so in deference I have substituted “impractical.”

[9] Coordinated Local Aquaculture Management System.

[10] The Maine industry has adopted such a bay management plan for Cobscook Bay.

[11] There is much public misunderstanding about the adjudicatory legal process. It is often accused of failing to protect the public interest. This perception is unfortunate. Properly understood and used, it is the best available protector of the public interest. The Department of Marine Resources and the Attorney General's office should develop educational materials for the use of all participants in the aquaculture leasing process. In the meantime, see the brochure "Marine Aquaculture: How the Public Can Participate in the Leasing Process for Marine Aquaculture Farms in Maine" available from the Maine Department of Marine Resources.

[12] The concept of "nested platforms" is described with literature citations in Rockefeller 2003. A few copies may be available from the Maine Department of Marine Resources.

direction, reducing uncertainty, and replacing the current "ad hoc", as alleged by critics,[13] practice. But zoning would almost certainly foreclose aquacultural opportunities in the future that are not now apparent. Aquaculture is in its infancy; there are a number of species that could be cultured, not just for human food, and there is a diversity of possible growing environments on this varied coast. Zoning could lead to undesirable crowding of farm sites with increased risks of diseases and other biological and environmental problems. Such a zoning plan could also lead to a "gold-rush" phenomenon within the "open areas", exacerbating the current controversy. Some of the applications within the "rush" very likely could be purely speculative and some would be ill-conceived – neither to the advantage of the state.

It has been suggested that aquaculture should be practiced only in contained facilities on land, an idea that was explored and abandoned in Maine years ago. New technological developments may make it practical for broodstock maintenance or finfish hatching (for strictly marine species) on land facilities, but a Scottish report (Anon. 2002) notes that the capital costs for land-based grow-out facilities are "particularly high and are not justified...and there is an inherent risk of biomagnification of disease in recirculated sites." A second Scottish report (Anon. 2003) notes that "since it [land-base aquaculture] is calculated to add significantly to production costs in comparison with cage ongrowing, so much so that it is fundamentally uneconomic, it is regarded as generally unsuitable for the replacement of cage production of ongrown fish for human consumption." Although stated in general terms, these conclusions may refer specifically to Scottish conditions. Land-based aquaculture is practiced elsewhere in Europe. Even so, it is likely that land-based operations in Maine could be expensive for land acquisition and for winter heating requirements. A criticism in Maine is that aquaculture is dominated by foreign owners. An insistence upon capital-intensive land-based aquaculture, if it were technically or economically practical, could eliminate the opportunity of many Maine residents to become aquacultural entrepreneurs.

These kinds of proposals – Bay Management, zoning, and land-base aquaculture – may appear to address concerns about the practice of aquaculture, but may be unrealistic and impractical or cost-prohibitive.

C. Further Concerns

There is an element of unreality in some of the concerns expressed about the industry and the adjudicatory process for considering leases. More than one group of concerned people list problems posed by aquaculture that go beyond the realm of rationale concern, for example, aquaculture "create[s] local dependence upon a single industry,"[14] or the adjudicatory process "fail[s] to recognize and accommodate the legitimate concerns of others."[15]

Among the many concerns is the fear that concentrated fish in pens or shellfish on the bottom will

[13] The term "ad hoc" suggests a casual approach to the consideration of lease applications. The reality is otherwise.
[14] www.epbea.org

[15] Conservation Law Foundation List of Concerns to Be Addressed Through Improved Lease Siting Process. n.d. Unpublished.

result in environmental degradation because of "nutrient overloading." This of course is a possibility and it has occurred elsewhere in the world, but studies in Maine have found little if any evidence of it (e g., Sowles and Churchill MS 2003). The Department of Marine Resources (DMR) pre-lease-hearings site evaluation procedures routinely take this possibility into account.

Briefly, three other concerns are diseases, sea lice infestations, and degradation of sea-floors under fish pens. Diseases of course are a major concern to the industry and it modifies and improves its practices to minimize the possibility of diseases. An integrated pest management program has been adopted and is reported to be "highly effective"[16] for the control of sea lice. DMR inspects the sea-floor beneath all pen sites semi-annually. Most (about 85%) pen sites show no bottom degradation. Where such problems are found, mandatory fallowing (i. e., no fish permitted) results in habitat restoration, usually in six, but up to fifteen, months. Some sites have never experienced any of these problems. These are problems that are not likely to threaten the future of the industry.

There have been concerns that the aquaculture industry takes great quantities of fish from the sea as a source of food for cultured fish. In fact the industry depends to an ever decreasing degree for such food; much of that source of fish is remote from the Gulf of Maine and would be taken regardless of the future of aquaculture in Maine. This concern ignores the fact Maine's most valuable and traditional capture fishery takes large quantities[17] – quantities much larger than used by Maine aquaculturists – of sea fish from the Gulf of Maine for bait, to the point that an increasing number of people fear that the bait industry jeopardizes the viability of the bait fish resource. This in itself is an escalating controversy. This issue is included here because it suggests that there is a double standard of judgment at work – one among a number of double standards[18] – concerning the environmental impact of aquaculture in Maine. Perpetuating double standards does not enhance the credibility of those raising the issues and unfortunately diminishes the possibility of serious consideration of legitimate issues of concern.

D. The Wild Salmon

A legitimate and the most serious concern about salmon aquaculture in Maine is that of a possible threat to wild Atlantic Salmon. Sea-run salmon in Maine have been declining for many decades, quite longer than the presence of finfish culture.[19] Aquaculture clearly has not caused the decline,

[16] Associate Professor Michael Opitz, UMO.

[17] 220 million pounds of herring are taken each year for lobster bait according to a University of Maine study reported in the Portland Press Herald on August 14, 2003. This is a four-fold increase, according to a DMR estimate, since 1980.

[18] Interference with commercial and recreational navigation, serious disease potential, the use of chemicals, noise pollution, usurpation of traditional fishing grounds, loss or destruction of fishing gear and dumping of fishing gear on the bottom or on shorelines, and disruption of sea-floor habitats, among other concerns, are to be found in traditional Maine fisheries. The double standard is that while they are cited as issues associated with aquaculture, there is little or no public concern for these problems in other fisheries.

[19] There is a general assumption that anthropogenic causes have been reducing sea-run salmon in Maine, but it has also been suggested that Maine salmon, near the southern limit of their natural range, are retreating northward because of natural environmental variations - a phenomenon akin to the natural fluctuations in abundance of Gulf of

but the concern is that it might in some way cause the demise or prevent restoration of sea-run salmon.

A recent interim report (NAS 2002) by the National Academy of Sciences on the genetics of salmon in Maine offers no clear guidance on this issue. It notes that pen-reared fish compete poorly with wild fish and their reproductive success is low compared with wild fish. The report also notes that despite "heavy" stocking of Maine rivers over the years with Canadian salmon and other salmon not indigenous to the various rivers, Maine wild salmon remain genetically distinct within the various rivers. These facts suggest a question whether in fact pen-reared salmon are a threat to wild salmon restoration.[20] The principal concern seems to be that with even a very low level of escapement (much less than one percent) of penfish, the numbers in some not-clearly-defined way could overwhelm the wild fish, now in very low numbers in our rivers. Or that diseases or sea-lice may be transferred to wild salmon. This is an issue that must receive continuing serious attention. It is clearly in both the economic and the environmental interests of the growers to minimize such transfers or escapement. It should be noted that the salmon industry and several private groups concerned with the environment and salmon restoration entered into a formal agreement for cooperative efforts to protect sea-run salmon, including containment and marking methodologies of farmed fish. Escapements in recent years have been greatly reduced. (Is it possible to eliminate them?). And it is equally in the self-interest of salmon growers to minimize other potential problems that might jeopardize restoration efforts.

A recent legal analysis concluded that the Clean Water Act (CWA) and the National and Maine Pollution Discharge Elimination System programs (NPDES and MEPDES) can provide sufficient protection for wild salmon (Fleming 2002). The industry is greatly concerned about the impact of Endangered Species Act and MEPDES, but that concern may be exaggerated. At least one company is learning to live with those requirements. It is likely that the industry can adjust to their requirements, but the industry is concerned, nevertheless, that the Acts may be the cause of continuing litigation. One might here recommend the Precautionary Principle[21] on behalf of wild salmon. If one were to do so, one would also have to look at other industries near Maine's salmon rivers. Exercise of the Precautionary Principle in an equitable and truly effective way would have wide-ranging implications. Finally, on this question of threats to wild salmon, one would keep in mind that the possible cultivation of non-anadromous species on the Maine coast would pose no such threat.

Maine shrimp.

[20] A considerable peer-reviewed literature exists concerning interactions between farmed salmon and wild salmon in Canada, Norway, Ireland, and Scotland. The final National Academy of Sciences-National Research Council report on sea-run salmon and aquaculture in Maine, expected in late 2003, no doubt will include the most important references.

[21] "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." Principle 15 from the Rio Conference on the Environment and Development, 1992. See also Anon. 2003: "the [precautionary] principle [is] that all responsible parties should act prudently to avoid the possibility of irreversible environmental damage in situations where the scientific evidence is inconclusive but the potential damage could be significant."

Aquaculture production in Maine is vulnerable to occasional adverse environmental conditions. The best strategy to mitigate this reality, of course, is the cultivation of a diversity of species.

5. Aquaculture's Opportunities

Only five species (salmon, oysters, mussels, clams, and seaweeds) are in significant aquacultural production in Maine at this time. Probably at least a dozen finfish, shellfish, and seaweed species could be cultivated in the foreseeable future.

Only from the air can one fully appreciate the very great extent (it is tempting to write the "immensity") of Maine's coastal waters. Only from the air can one appreciate the minute fraction of the coastal waters presently occupied by aquacultural activities and the negligible impact they have on navigable waters and traditional fishing grounds. And only from the air can one begin to appreciate the great extent and diversity of marine habitats along the coast. Such a diversity of habitats suggests the possibility of cultivating considerably more than the few species now under cultivation, whether by cage culture, raft culture, submerged cage culture, suspended rope culture, bottom culture, or technologies not yet conceived.

The coast of Maine undoubtedly has habitats favorable for a variety of species. This potential diversity of species could lend greater stability to total production and marketability of the products, buffering the industry against economic and environmental variabilities. With this growth potential comes an opportunity to become a center for the development of innovative technologies and methodologies of cultivation – a growth industry in itself. And it offers the potential for development of spin-off products such as the current use of salmon blood products for medical research. The industry could be developed as a compatible tourist attraction providing further diversification and strength to the downeast economy. Even now tour boats and kayakers visit salmon farms to watch the fish jump in the cages.

The larger opportunity here is that in addressing the confrontation surrounding the aquaculture industry, Maine may recognize that it ought also to address the growing tension surrounding other inevitably competing uses on the coast.

6. Aquaculture's Challenges

A. Accommodation

The challenge is to find accommodation among these competing interests. The solutions to other challenges to the growth of aquaculture[22] – largely technological and managerial – will almost certainly follow with the maturation of the industry if this primary accommodation can be found.

[22] Such as diseases, sea-lice, and environmental impacts on the bottom.

The Maine industry increasingly expresses its disenchantment with the current environment of statutory and regulatory uncertainty, social hostility, and ever-present threat of litigation. The loss of the aquaculture industry, whether by default or by deliberate choice, would do nothing to attract, and could possibly discourage the location of, any other substantial and "clean" industry of comparable magnitude to coastal Maine.

A number of concerns expressed about aquaculture in Maine have little substance or validity; they could be set to rest by effective exchange of information about the industry. Other concerns have substance. The industry has developed and adopted a standard Code of Practice for finfish aquaculture that addresses many of these legitimate concerns. It is doing the same for shellfish aquaculture. There have been notable improvements in industry practices and in state agencies' monitoring of those practices and impacts in the brief history of aquaculture on the Maine coast. But there has not been effective public presentation of the facts of aquacultural practices and monitoring. The industry has not defended itself with a forceful and sustained presentation of the realities of the industry.

Some people within the industry believe that an industry presentation of the facts would be construed as special pleading; they believe that a persuasive case would have to be presented by an informed, neutral third party. But who would be that third party? Some people seem to believe that DMR, or the "State", is prejudiced in favor of aquaculture. In fact, DMR seems to have dealt rather evenhandedly over the years with aquaculture applicants, granting leases to some and denying a not inconsiderable number of leases for a variety of reasons.[23]

The adjudicatory proceedings by which DMR must consider lease applications impose a substantial legal burden on DMR to act as disinterestedly as any administrative entity that must decide issues in the public domain. The process is viewed as unnecessarily burdensome and time consuming by applicants and as intimidating or prejudiced by intervenors and adversaries. It is certainly burdensome and time-consuming precisely because it is intended to protect legitimate public interests. The nature of the process is as fair and objective as the mind of man has devised, and DMR continues to attempt to refine it in the interests of fairness and objectivity to all parties to a lease application hearing.[24]

B. A Credible, Neutral Source

If the state is rejected as a neutral third party for presenting a balanced, objective and informed statement of the industry, who then could it be? The state university is not in a good position to assume that role. Both the university and the Sea Grant program are viewed by some as biased because of their work on behalf of aquaculture, and the industry is suspicious of the work of some

[23] An objective report and evaluation of DMR's administration of the aquaculture statutes, conduct of the adjudicatory process, and monitoring of farm sites and practices would be beneficial for informed public understanding of the role of the department in this controversial issue.

[24] LD 1417 to that effect was enacted in 2003.

scientists at the university as it relates to aquaculture. The Maine Aquaculture Innovation Center might be viewed as an advocate of the industry, as in fact the Legislature intended it to be. It appears that there is no existing entity in Maine that could disseminate information clearly perceived by all the public to be neutral and objective. The possibility may be that the Governor or Legislature may have to invite credible and informed (possibly non-Maine?) authorities to form the disinterested third party – similar to investigations by the National Academy of Sciences – for the dissemination of credible, factual information.

Maine will not deliberately nor wittingly abandon this industry, so appropriate for our coastal waters and of such potential magnitude for the benefit of Maine residents and for the protein needs of the world's growing population. But Maine could lose it by default if not by design. The essence of the problem seems to be that of "fitting in" the industry along an increasingly crowded coast that attracts an ever increasing number of people who resist deviation from their vision of what the coast ought to be.[25] The state could lose the industry if the public does not realistically understand the weaknesses, the strengths, and the potentials of the aquaculture industry.

C. Public Education

It has been proposed that broad public education is necessary to set aquaculture in a context for informed, responsible, and objective public policy formulation, for it is quite possible that if the State of Maine does not articulate its policy on this industry, it may well lose it whether it wants to or not. Public education about aquaculture has been characterized by a neutral and informed observer as "hugely important." And there is little doubt that education could do much to reduce the social tensions permeating this issue. But there may be a core of people irrevocably opposed to aquaculture on our coast. It may be that no educational program would change their views and their opposition, but public education could minimize their influence.

The matter of public education is a larger issue than that of disinterested, neutral persons objectively describing the factual nature of the industry. It must encompass not just facts alone, but also the life styles and aspirations of all coastal residents of Maine. The question, then, of who could credibly and objectively conduct the public education project becomes more difficult and critical.

"Fitting in" would require a high degree of respect and accommodation among industry advocates and those with concerns about industry impacts. The latter must respect the right and desire of coastal residents to earn a decent, meaningful, productive livelihood and the development of economic opportunities appropriate for the coast. Industry advocates must respect (through noise abatement, good housekeeping, light attenuation, and similar measures.[26]) the defensive, tenacious, and profound attachment of seasonal and year-round residents to an environment and a way of life found rarely apart from the coast of Maine. (One shellfish aquaculturist is attempting to develop

[25] 17 MRSA 2807, which has to do with visual impact, was enacted in 2001 to protect the commercial fishing industry for exactly this reason.

[26] A number of these concerns were incorporated into Maine's aquaculture lease statute in 2003.

submerged oyster rafts to minimize visual impact.[27]) And industry proponents must be diligent about minimizing adverse biological and other impacts upon the environment.

Concerned people must recognize that whereas aquaculture may impinge upon their favored perception of coastal Maine, there can be no doubt that the rapidly changing social circumstances of the coast have to a significant degree affected the access of fishing families of Maine to shorefront access and to the coastal waters themselves – essential for the continuation of this generations-honored tradition that shapes the soul of coastal Maine.[28] Mutual accommodation is the only solution to this tension.

The visual impact of aquaculture may be the primary concern of many people; this is a legitimate concern. There have been examples of industry neglect of its responsibility to respect this concern and to mitigate its visual impact. It is in the interest of all to protect the special character of the Maine coast. It is perhaps unfortunate that people who have that legitimate concern for visual impact may try to disguise it or to reinforce it by professing many other concerns – some of them peripheral or without substance – which may only obscure and divert discussion away from important and basic concerns. It would be more productive for resolution of the controversy if the issue of visual impact were addressed forthrightly, with the recognition that it may be the most important and most difficult concern to be managed by the industry and by regulatory agencies. Indeed, DMR recognizes and continues to attempt to manage this important but fundamentally subjective issue (Fisk MS 2002). The Department of Environmental Protection has adopted procedures for addressing this issue on matters under its jurisdiction. There must be continuing efforts by all parties to resolve this question. In the end these are issues to be decided not by facts alone but by mutual commitment to the preservation of a subjectively and traditionally defined way of life in the broadest sense that respects and accommodates a variety of physical and psychological needs among people who share one aspiration – a better coast of Maine that offers a rewarding future for all its residents.

[27] The University of New Hampshire is experimenting with submerged fish pen cages.

[28] Governor John Baldacci recently formed a Working Waterfront Coalition to address this problem.

D. New Ways of Thinking

Is Maine morally obliged to contribute to world protein deficits and demands by development of its aquacultural potential? Whether so obliged or not, the inexorable increase with time of demand for animal protein almost certainly will repeatedly raise the issue of increasing aquaculture production on our coast. Maine would be well advised to anticipate that development and develop a policy for the orderly rather than haphazard and confrontational development of that eventuality.

Will Maine recognize that a clear, explicit policy is needed to guide coastal development as "competing" uses increase in a more crowded future?

How will Maine develop an objective, fair, credible policy-formulation entity and mechanism? Maine's newly formed Aquaculture Task Force may find a way to do this.

Would Maine, if consensus were not possible, consider a policy that deliberately favors one interest to the disadvantage of another? With present pressures on the coast, it seems inevitable that Maine will experience that outcome even without an explicit policy; the absence of a policy can result in the same outcome – and it carries a substantial risk that it would not be an outcome that Maine people of whatever persuasion would choose.

7. The Need for Policy Development

Maine must adopt an explicit policy for its wealth of coastal waters that makes clear that a diversity of legitimate interests and aspirations shall be accommodated and balanced. The policy must be substantive with clear guidelines – performance standards – for implementation of the policy, and it must be endorsed by the Legislature and the Governor.

A. Coastal Conflicts

The confrontation among those involved in the controversy over aquaculture is part of a larger problem on our coast. There is growing demand among competing uses for finite and shrinking resources. Escalating land valuations ("overly inflated destructive real estate prices"[29]) drive out low income families with generations of history on the coast. Coastal access by traditional fishermen is an increasing problem. Harbor mooring sites are in short supply, and private moorings, used infrequently, are increasingly usurping anchorages outside of traditional harbors. Fishing operations encroach upon navigable waterways. There is no state policy that addresses these and other ever-increasing competing uses of the coast.

The social tension surrounding aquaculture is the immediate and most urgent coastal policy issue; it is the "flash point" that Maine must address. An explicit and definitive statutory statement of policy would seem to be essential if aquaculture is to "fit in" and have a future on this coast. Aquaculturists have expressed the conviction that the continuing flood of proposed adversarial legislation, or

[29] Editorial, Fishermen's Voice, September 2003.

increasing confrontations at lease hearings, means that whether a particular legislative bill passes or fails, or a particular lease is granted or denied, the aquaculturists lose. They lose in the sense that they cannot afford continuing legislative or legal battles, or that potential investors will abandon Maine, turning to more receptive, less adversarial environments. Some aquaculturists believe that is the intent of many legislative proposals. Legislative proposals would likely continue in the absence of a clear state declaration of its position on aquaculture.

B. Clarifying Expectation

The value of a state policy is in large part that it would notify all those with an interest in aquaculture of what to expect; it reduces the fundamental uncertainties that are presently the primary concern of both sides. Policy informs both sides that neither will nor can "win" or "lose", but that each must find a way to accommodate the other. A definitive policy would inject much-needed stability into an increasingly acrimonious controversy. Such a policy would reaffirm that the Maine coast is a "working" coast.

C. The Elements of a Policy

An adequate aquaculture policy, most importantly, must state whether or not it is the desire and intent of Maine to encourage and sustain an aquaculture industry under responsible operating standards. If that is the state's intent the policy should include:

1. Stabilization of the legislative-regulatory process. No human enterprise can prosper or approach its full potential within an uncertain or unstable environment. An aquaculture policy would reduce legislative-regulatory uncertainties by establishing performance standards for the industry within which the propriety of any new legislative or rules proposals could be evaluated and considered or rejected.

2. A public education program. A commission of credible, informed, neutral persons should be established to develop and put into effect a program of public education that disseminates factual information about aquaculture, the leasing process, the role of the public within that process, and the practice and regulatory oversight of the industry. The purpose would be to insure that discussions of and actions related to aquaculture proceed in a rational, thoughtful, relevant, and focused manner. The commission should also review and make recommendations to the regulatory agencies concerning mitigation of visual impact of aquaculture. The commission should be jointly funded by the Legislature and the industry.

3. An economic or investment program. There is not unanimity within the aquaculture industry whether an economic incentives plan is important or desirable. But the development of a state policy should include a thorough consideration of the potential benefits of such incentives and whether the state has a favorable investment climate. If Maine wishes to encourage greater Maine ownership of aquaculture enterprises, such incentives may be appropriate. Apprentice programs for technological training, low interest loans, and marketing and sales cooperatives might enhance the possibilities for residents without large capital resources to enter the industry.

4. An innovation-development plan. The great extent and diversity of the Maine coast suggests a great potential for aquacultural development. Thirty years ago it was suggested that aquaculture could be Maine's most valuable industry (Anon. 1971). That may have been hyperbole, but the actual potential could be substantial. We will never know unless the people of Maine recognize and take this possibility seriously – and make a commitment to the exploration of the potential. That commitment is presently lacking. The state should develop and adopt a research and development plan that fully explores the possibilities for aquacultural development – new species, new habitats, new technologies, new markets, new opportunities.

Whether within such a policy or not, the State of Maine must insure that its agencies interpret, administer, and enforce federal and state statutory and regulatory criteria – that is, performance standards – for aquaculture professionally, credibly, and equitably.

D. Implications

It would take time to develop a beneficial, far-sighted aquaculture policy. The process should not be rushed. Some parties to the controversy may not wish a policy at all; others may be impatient at the delay. But the fact that such a policy were in the process of development would have some of the important benefits of the policy itself. It would serve notice that Maine intends to find the necessary accommodation among the contending interests, and it would reassure investors that there is a future for aquaculture in Maine.

Clearly, failure to resolve the aquaculture controversy will result in continuing and escalating confrontations on the coast.

The aquaculture controversy is a symptom of an accelerating rate of change of coastal uses and values – a microcosm of global transitions. Will Maine drift or chart a course?

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